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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/837,503	04/18/2001	Vincent M. Callaghan	01-104	8044
7590 01/05/2004				
Gregory P. LaPointe BACHMAN & LaPOINTE, P.C. Suite 1201 900 Chapel Street New Haven, CT 06510-2802			EXAMINER RIDLEY, BASIA ANNA	
			ART UNIT 1764	PAPER NUMBER

DATE MAILED: 01/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/837,503

Applicant(s)

CALLAGHAN ET AL.

Examiner

Basia Ridley

BR

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-11 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - recitation of “pph” throughout the specification is not clear.

Appropriate correction is required.

Drawings

2. The drawings were received on 25 August 2003. These drawings are acceptable.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim(s) 1-2, 5 and 11 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Chludzinski et al. (USP 4,473,622).

Regarding claim(s) 1, Chludzinski et al. disclose(s) similar fuel cell system comprising:

- a fuel processor (17) for converting a hydrocarbon fuel (10) into a high temperature reformed gas containing hydrogen, carbon dioxide and carbon monoxide;
- first conduit means for communicating the reformed gas to a shift converter (24) located downstream of the fuel processor (17) for further converting the reformed gas to primarily hydrogen and carbon dioxide containing gas stream;
- second conduit means for communicating the gas stream to a fuel cell (2) downstream of the shift converter (24) for reacting the hydrogen in the gas stream;

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- a water source (2); and
- water means (20, 21, 25) for feeding water from the water source to at least one of the first and second conduit means in a controlled manner for cooling at least one of the reformed gas and gas stream, respectively to a desired temperature (C3/L42-49).

Regarding claim 2, while Chludzinski et al. does not explicitly disclose that water added to said reformat gas sets the desired oxygen/carbon ratio for the shift converter, said ratio will be set, inherently in the system disclosed by the reference.

Regarding claim(s) 5 and 11, Chludzinski et al. disclose(s) similar fuel cell system comprising:

- means (20) for collecting water from the fuel cell (2) and recycling at least a portion of the collected water to the water source;
- wherein water is fed to both the first and the second conduit (by means 20, 21, 25).

Regarding limitations recited in claims 1-2, 5 and 11 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

Instant claim(s) 1-2, 5 and 11 structurally read(s) on the system of Chludzinski et al.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claim(s) 3-4 and 7-8 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Chludzinski et al. (USP 4,473,622) in view of Boochever et al. (USP 4,042,016) or Ginter (USP 3,651,641).

Regarding claim(s) 3-4 and 7-8, Chludzinski et al. disclose(s) all of the claim limitations as set forth above. Additionally the reference discloses that while water transfer devices of the instant invention use polymeric membranes, it is also known in the art to condense water out of the fuel cell effluent and to add said water into another process stream (C7/L9-32), but the reference does not explicitly disclose said system including control means for controlling the feeding of water to at least one of the first and second conduit means, wherein the control means senses the temperature of the reformed gas and gas stream, respectively, and feeds water to at least one of the first and second conduits, respectively, in response to the sensed temperature, wherein the system further includes at least one solenoid valve and means to atomize water.

While Chludzinski et al. does not explicitly disclose that the temperature of the gas streams in the first and second conduits needs to be controlled, examiner takes official notice that it was known in the art at the time of the invention to control temperature of gas feed stream for shift reactor and for fuel cell for the purpose of optimizing performance of said shift reactor and for fuel cell.

Additionally it was known in the art at the time of the invention that water can be atomized and sprayed into a gas stream to humidify said gas stream and to provide evaporative cooling of said gas stream. Further it was known in the art at the time of the invention that temperature of said gas stream can be controlled efficiently when flow of water into said gas stream is controlled by a controller comprising a temperature sensor and a solenoid valve (as

evidenced by Boochever et al. (columns 2-4) or Ginter (C10/L26-C12/L14).

In view of the knowledge available to one of the ordinary skill in the art at the time of the invention, as set forth above, an ordinary artisan would replace the water means of Chludzinski et al. with the system including control means for controlling the feeding of water to at least one of the first and second conduit means, wherein the control means senses the temperature of the reformed gas and gas stream, respectively, and feeds water to at least one of the first and second conduits, respectively, in response to the sensed temperature, wherein the system further includes at least one solenoid valve and means to atomize water, as taught by Boochever et al. or Ginter, for the purpose of being able to efficiently control the temperature of the gas streams in said first and second conduits, and for optimizing the operation of the shift reactor and the fuel cell.

Regarding limitations recited in claims 3-4 and 7-8 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

7. Claim(s) 9-10 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Chludzinski et al. (USP 4,473,622) in view of Sederquist (USP 4,530,886).

Regarding claim(s) 9-10, Chludzinski et al. disclose(s) all of the claim limitations as set forth above. Additionally the reference discloses that while water transfer devices of the instant invention use polymeric membranes, it is also known in the art to condense water out of the fuel cell effluent and to add said water into another process stream (C7/L9-32), but the reference does not explicitly disclose said system including a packing of high surface area material and water being fed into the material, wherein said high surface area material is selected from the group

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consisting of ceramic pellets, steel wool, reticulated ceramic foam, metal foam and honeycomb monoliths.

Sederquist teaches that efficiency of humidification of a gas stream can be increased by using a packing of high surface area material and water being fed into the material, wherein said high surface area material is selected from the group consisting of ceramic pellets, steel wool, reticulated ceramic foam, metal foam and honeycomb monoliths (C3/L47-58).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a packing of high surface area material of Sederquist in the humidifier of Chludzinski et al. for the purpose of increasing humidification efficiency.

Regarding limitations recited in claims 9-10 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

8. Claim(s) 17 is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Chludzinski et al. (USP 4,473,622) in view of Bloomfield (USP 3,982,962).

Regarding claim(s) 17, Chludzinski et al. disclose(s) similar fuel cell system comprising:

- a fuel processor (17) for converting a hydrocarbon fuel (10) into a high temperature reformed gas containing hydrogen, carbon dioxide and carbon monoxide;
- first conduit means for communicating the reformed gas to a shift converter (24) located downstream of the fuel processor (17) for further converting the reformed gas to primarily hydrogen and carbon dioxide containing gas stream;
- second conduit means for communicating the gas stream to a fuel cell (2) downstream of the

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shift converter (24) for reacting the hydrogen in the gas stream;

- water feed means (20, 21, 25) for feeding water from the water source to at least one of the first and second conduit means in a controlled manner for cooling at least one of the reformed gas and gas stream, respectively to a desired temperature (C3/L42-49).

While Chludzinski et al. disclose(s) that gas produced by the fuel processor is used in a fuel cell, the reference discloses only three of the process steps which are customarily used when producing hydrogen gas for use in the fuel cells. As evidenced by Bloomfield, system which produce hydrogen gas for use in fuel cells comprise process steps disclosed in Chludzinski et al., (e.g. fuel processor and shift converter) may also comprise other process steps, e.g. selective oxidation. The specific process steps being selected based upon the type of fuel being processed and upon the particular design of the cells in the fuel cell stack (C2/L36-50).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add a selective oxidizer positioned between the shift converter and the fuel cell, in the apparatus of Chludzinski et al., as taught by Bloomfield, for the purpose of increasing systems flexibility with respect to the type of fuel being processed and to the particular design of the cells in the fuel cell stack.

Once the selective oxidizer was positioned between the shift converter (24) and the fuel cell (2), in the apparatus of Chludzinski et al., said selective oxidizer would be, necessarily located downstream of where the water feed means (20 and 21) feeds water to the at least one of the first and second conduits.

Regarding limitations recited in claim 17 which are directed to a manner of operating disclosed system, the examiner notes that neither the manner of operating a disclosed device nor

material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP 2114 and 2115.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Allowable Subject Matter

10. Claim 6 is allowed.

Response to Arguments

11. Applicant's arguments filed 25 August 2003 have been fully considered but they are not persuasive.

Regarding claim 1, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., atomizing water during injection) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). While the applicant argues that water membranes of Chludzinski et al. "can hardly be considered to meet the feed of water to a stream for the purposes of cooling", the examiner would like to point

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out that since said water membranes add water to a gas stream, wherein said gas stream has higher temperature than said water (C3/L46-53), said gas stream will inherently be cooled.

Applicant's arguments with respect to claim 17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (571) 272-1453. The examiner can normally be reached on Monday through Thursday, from 9:00 AM to 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola, can be reached on (571) 272-1444.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

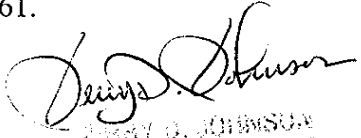
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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Basia Ridley
Examiner
Art Unit 1764


BASILY D. RIDLEY
PRIMARY EXAMINER
GROUP 1100


BR
December 14, 2003